WAP Kitchen

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Abstract

We present an art installation entitled "WAP kitchen", presented at the 7th International Festival of Computer Arts in Maribor, May 2001. The project is a result of collaboration of the academic sculptor Dušan Bučar from the Academy of Fine Arts with students and educators from the Faculty of Computer and Information Science under the supervision of prof. Franc Solina and prof. Srečo Dragan. The installation presents a vision of interaction of men with environment, embodied in a futuristic kitchen, where people can interact with its elements through the WAP protocol using mobile phones.

1 Introduction

The on-going collaboration between the Academy of Fine Arts and the Faculty of Computer and Information Science, University of Ljubljana, resulted in several computer art and video projects [2, 3, 5, 6]; some of them were presented at the two last editions of the International Festival of Computer Arts, held in Maribor [4, 5]. In these joint projects, authors tend to gather the technological skills and the analytical capability of computer technicians with the more abstract creative forces from the art field. The relation between art and technology is constantly being questioned and as a result new ideas and forms of cooperation arise.

The idea and the artistic concept of the "WAP kitchen" arises from the installation by Dušan Bučar, held at the Bežigrad gallery, presented to the public in January 2001 (Figure 1). At this exhibition, the artist presented both sculptures, created in traditional techniques, and objects based on modern media, such as video and computerized art. The leading theme of the artwork was a representation of a kitchen as a social environment or, at he same time, as an alchemist workshop, where everyday things, such as kitchen utensils and gadgets get reinterpreted in an artistic way, yet their form still preserves their

Figure 1: D. Bučar: Kuhinja/Kitchen 1999, metalwork, cardboard, woodwork, 280×87×230 cm. Mali gospodinjski pripomočki/Household gadgets, 1998, ironwork.

functionality and origin. One of the principal aspects of the work was to achieve a natural coexistence of the traditional and modern paradigms, which Bučar explains as a kind of intercooking — alchemy. Intercooking at the same time describes the

> *...whole artistic activity ... enabling the continuation of the creation, and continual and infinite adding to and amending the primary idea with similar or equal ones [1].*

The author was further interested into the relation between the traditional techniques and the modern media. He exemplifies this with the role of a sculptor in the new technological era, when virtuality and simulation is taking over reality. As he claims, modeling the materials by hand remains a guarantee for the reality, since this process can be handled only in real-time, measured by the human thought. There is however absolutely no reason for not expanding the limits of the manual work to new dimensions. The challenge is how to relate this reality of primal creativity with the new reality of virtual media, which

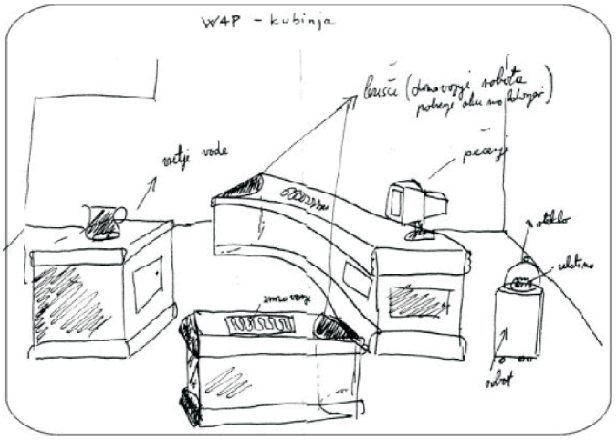

Figure 2: D. Bučar: WAP Kuhinja/WAP Kitchen, 2001, sketch.

> *...has escaped from its habitat and penetrated our real life – just as the virus penetrates a healthy cell [7].*

Following this spirit, a technological evolution of Bučar's kitchen was just a matter of time.

2 The artistic concept of the "WAP kitchen"

The project was initiated by the idea to transform the Bučar's kitchen into an "interactive alchemistic workshop", where the spectator could use modern communication technologies, such as WAP, to interact with its elements. The idea was in tune with the previous work; in fact a successful realization would help to redefine technologically advanced actions of users and artists in cyberspace as everyday ordinary actions - as baking, cooking or housekeeping. Further, it would demystify the accessibility of modern technologies; indeed, as it was clear at the end of the project, "WAP kitchen" can be built at little expense with moderate technical skills.

The graphical sketch of the first draft of the kitchen made by Bučar can be observed in Figure 2. The figure shows the primary elements of the artwork that were established as the basis for further development - a spatial structure of the kitchen, made of metal, card and wood using traditional sculpting techniques, the WAP controlled kitchen utensils, which represent typical actions in the physical world - heating, boiling, freezing and baking, and a mobile robot.

In the first concept, three WAP controlled devices were introduced: a cooking plate with a cattle full of water, which could be turned on and off by the user; a freezer's compressor with the freezing pipes, also controlled by the user, and a "microwave oven" represented by a computer monitor on which selected videos of baking food and materials could be interactively run.

The mobile robot represented the mobile part of the kitchen. In the artist's concept, it represents a particle that divides from the homogeneous structure of the sculpture and finds its way in the spectator's space. The principle of robot's interaction with the spectator was not thoroughly defined, as the on-going research on autonomous navigation and interaction with the environment was still at the very beginning.

3 Realization

The group members for the technical realization of the project were Matjaž Auflič, Slavko Mervar and Mihael Škarabot, all students at the Faculty of Computer and Information Science, University of Ljubljana, who developed the WAP infrastructure, and Matej Artač and Matjaž Jogan from the Computer Vision Laboratory at the same faculty, who worked with the mobile robot.

3.1 The WAP infrastructure

The system for the communication and interaction with the kitchen elements was planned as consisting of the following objects:

user The spectator. WAP kitchen offers him a possibility of interaction by turning on and off the kitchen utensils, and possibly control the robot.

WAP kitchen The kitchen itself contains utensils and gadgets that can be controlled by turning on and off electrical switches.

WAP phone Any WAP equipped mobile phone which supports WML 1.0.

web server The Apache 1.3 web server was selected as it supports advanced mime-types for WAP based applications (wml etc.). The web server also had to support the execution of CGI programs of EXE type in the MS Windows environment. The computer on which the web server is installed must have a fixed connection to the internet and a fixed IP number.

CGI interface The program that receives demands from the web server, generates a text control file and returns modified WML pages back to the server.

control file This control file is used for the exchange of information between the CGI interface and the system for scanning of the control file .

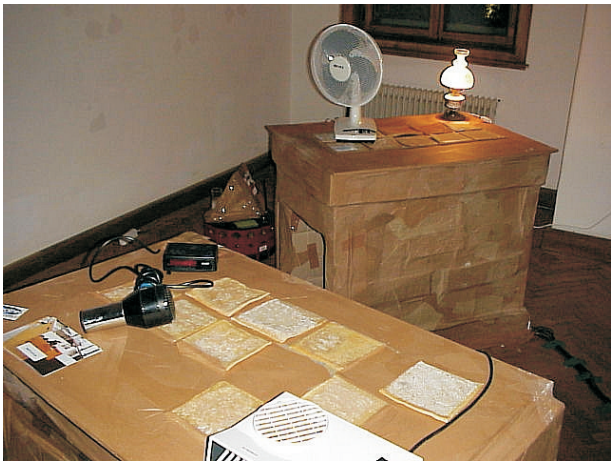

Figure 3: Kitchen utensils in the "WAP kitchen".

system for scanning the control file This system checks the text control file in a predefined time interval (every second in our application). In the case of a change in the control file, it sends instructions to the system for communication with switches.

system for the communication with switches A subroutine that, using an interface, sends a demand for switching on/off an utensil to the switch.

The procedure of querying the state of the gadgets is the following: the user interacted with the WAP phone, which sent a demand for a WAP page to the web server. The server demands a creation of the page from the CGI interface, which, using the data in the control file, returns the updated page back to the server. The server provides the page to the WAP phone, which displays it on the screen for the user.

When the user wants to change the state of an utensil in the kitchen, he again interacts through the mobile phone, which sends a demand to the web server, which passes the demand to the CGI interface. The latter changes the state of the utensil in the textual control file. When this file gets scanned by the system for scanning of the control file, the request for changing the state is passed to the subroutine for the communication with the switches. The switches then enable or disable the selected kitchen utensil.

The control file was made simple by naming every utensil by its name, and denoting its state by `on` or `off`, e.g:

```
Fan=on
Oven=on
Lamp=on
Heater=on
```

The kitchen gadgets in the final installation were the following: an electric fan, a radio–clock, a hair–dryer, an electrical heater, an electrical mosquito–repellent and a lamp (Figure 3). The visitors of the exhibition found the interaction with the system simple and straightforward (Figure 4).

Figure 4: Interacting with the "WAP kitchen".

3.2 The mobile robot

The mobile robot used as the mobile particle of the interactive sculpture is a Magellan Pro model, built by Real World Interfaces (RWI). The robot comes equipped with 16 sonar sensors, 16 infrared sensors and 16 bump sensors. The particular model has also an onboard pentium-II computer running Red Hat Linux. To communicate with the onboard PC, the wireless LAN is being used.

For the task of autonomous navigation in the gallery, a navigation system was developed that uses sonar sensors in order to build a temporary "probabilistic grid" (Figure 5), which helps the robot to detect obstacles such as walls, persons, objects, etc.

The probabilistic grid is build by scanning the outputs of the sensors and then including them in the representation by changing the values of cells in the grid that represents the surroundings of the robot. The output of the sonar sensors require the application of a special model that accounts for the uncertainty of the sonar. The outputs get registered on the grid using the odometry from the robot wheels; the

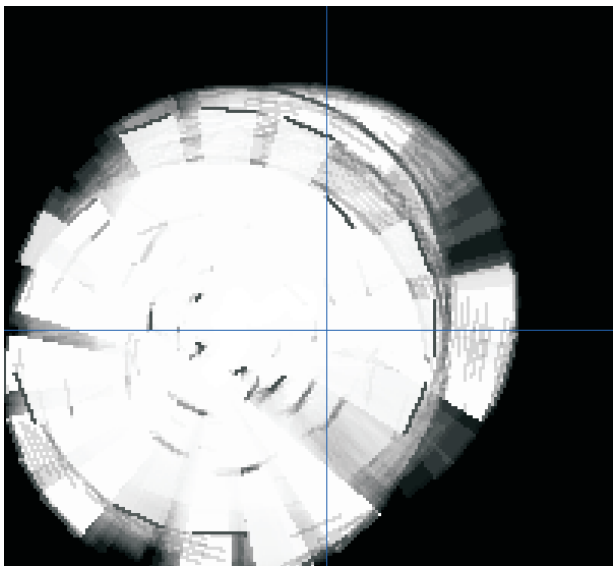

Figure 5: The probabilistic grid built using the sonar and infrared sensors.

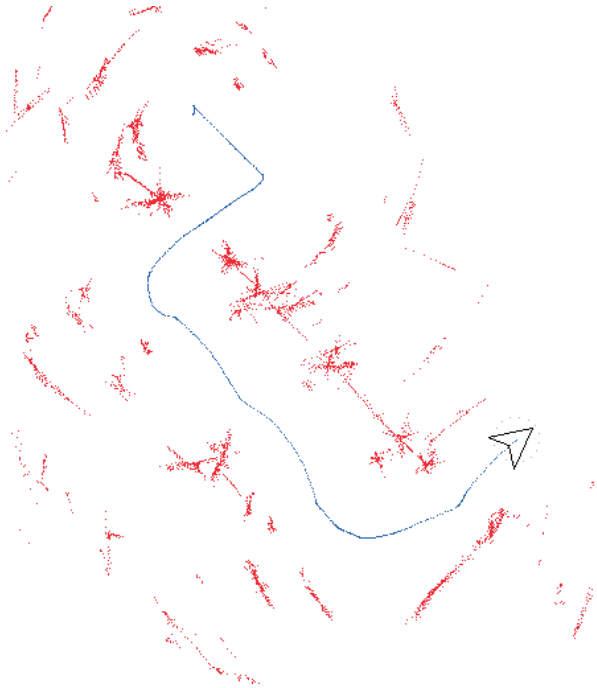

Figure 6: The map of environment built from the probabilistic grid.

zones that are impenetrable by the sonar get a low value, while the zones of open space get a high value.

Although an approximate map of the environment, such as the one in Figure 6 can be built using such a grid, a global representation was not used in our installation. Instead, the robot made decisions on his movements only from the local knowledge of the configuration of obstacles. When a point was selected as a goal, the robot proceeded in that direction, until an obstacle was sensed. By using the bump sensors, the robot could also react to physical interactions, such as bumping in spectators or their intentional kicking. In these case, the robot stopped immediately and moved back slowly until he was capable again to find a free space to move into.

During the opening of the installation, the robot was freely moving in the spectator's space and the visitors were curiously interacting with it, trying to discover the mechanism behind its movement. Due to a lack of time, no interaction over the WAP phone was implemented for the robot itself; however due to the response of the public, it would be interesting to include such an option in future projects.

4 Overview

The theme of the ALU exposition at the Festival of Computer Arts was "Big Brother is Watching You". This also relates to the mobile technology used in the "WAP kitchen". The question of remote control and surveillance is going to be of a primary interest in the next few years, especially after the increased terrorist activity which resulted in the total destruction of the New York WTC. One can only imagine how technology will be used for protecting the Western Civilization.

The "WAP kitchen" demonstrates the magnificent possibilities of the remote control of home appliances, yet it is also a warning – indeed, it can turn in a perfect instrument for destruction. A skilled terrorist could just burn your potatoes or destroy your apartment – by interconnecting the physical and the virtual world, the threats become suddenly organic. So, the question the installation poses is – is technology always a commodity or can we define some limits where such commodities make no sense? One of the devices in the kitchen was a radio–clock set to a very high volume which, when turned on, emitted tons of useless noisy information. Indeed, this was an act of terror; the users had to undergo the whole communication procedure in order to turn it off; yet in no time some other user turned it on again.

Part of the answer on the relationship between the traditional and new media comes from the authors words saying that

> *...if we think of a sculptor interfering with reality by making a sculpture, then the virtual part would be the process of installing it in a real social environment. The simulation and interaction of the spectator is then the process of bringing it all back to the reality.*

For Baudrillard, we do not use virtuality as a substitute for reality, as

Figure 7: The mobile robot attracts the attention of the spectators.

> *...we are not left apart or taken from – we own all the information. We are not just spectators, but are more and more part of the show... We are far from any alienation at all [7].*

During the building of the installation, both parts gathered precious experiences on collaboration between artists and technicians. As students involved in the project exclaimed,

> *...the artists think differently, and while listening to their plans, we have to adapt our way of thinking. If you are not familiar with art, some details seem irrelevant and obsolete. Later, however, it turns out that you were wrong as you were looking at it from just one point of view.*

The approach of the artist is also of great importance. Bučar understood it perfectly, conceiving that

> *...basically, it is a way of cooperation, artistic experimentation and scientific exploration on the grounds of the use of new technology. The basis of my effort is that the "WAP kitchen" must evolve in a work with a solid artistic statement. The particular elements, however, depend on the technical possibilities and skills and are a matter of constant discussion between myself, the students and the educators.*

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